

### Features

- Direct mount Full Port 316 Stainless Steel ball valve
- 3-piece swing out body designed for easy maintenance
- IP67 weatherproof polyamide enclosure with UV protection
- Multi-voltage with auto-voltage sensing
- Highly visual dome style valve position indicator
- Anti-condensation heater
- Manual override
- DIN plug type electrical connections
- Two auxiliary limit switches to confirm valve position
- RTFE ball seats
- Triple RTFE/FKM live loaded stem seals, adjustable
- DPS Positioner and BSR Failsafe options available

### Applications

Electric actuated stainless steel ball valve typically used for On-Off control of water, air, oil and other media compatible with the materials of construction. Suitable for steam service up to 25 PSI with optional high temperature mounting bracket kit and vacuum service up to 29"Hg. Optional DPS positioners and BSR battery spring return are available. Actuator is designed for 75% duty cycle.

### Operation

Electric actuated valve uses power-to-open and power-to-close, stays in the last known position with loss of power. On receipt of a continuous voltage signal, the motor runs and via a rugged all metal gear system rotates the ball 90°. The motor is automatically stopped by internal cams striking limit switches. On receipt of a reversing continuous signal, the motor turns in the opposite direction reversing the valve position. Valves with optional DPS positioner use an analog input signal to control the position of the ball (flow).

### Construction

|   |  |
|---|--|
| <b>Valve Body</b>                         | 316 stainless steel ASTM A351 CF8M           |
| <b>Ball/Stem</b>                          | 316 stainless steel                          |
| <b>Ball Seats</b>                         | RTFE (reinforced Teflon)                     |
| <b>Stem Seals</b>                         | RTFE (reinforced Teflon)/ Viton              |
| <b>Actuator Enclosure</b>                 | Anti-corrosive polyamide, IP67 weatherproof  |
| <b>Position Indicator/Manual Override</b> | Dome style indicator/manual polyamide knob   |
| <b>Fasteners</b>                          | Stainless Steel                              |
| <b>Auxiliary Limit Switches</b>           | 2 x SPDT 3A@125/250VAC, 30VDC resistive load |



### Description

Investment cast 3-piece full port stainless steel body/ball for unrestricted flow and minimum pressure loss. Bolted body designed for easy maintenance. Adjustable live loaded stem seal packing helps compensate for wear, pressure or temperature fluctuations, extending the cycle life of the valve. Blow-out proof stem. Standard corrosion resistant electric actuator includes a manual override, auxiliary valve position confirmation switches, anti-condensation heater, and electronic over torque protection.

### Approvals

#### Actuators

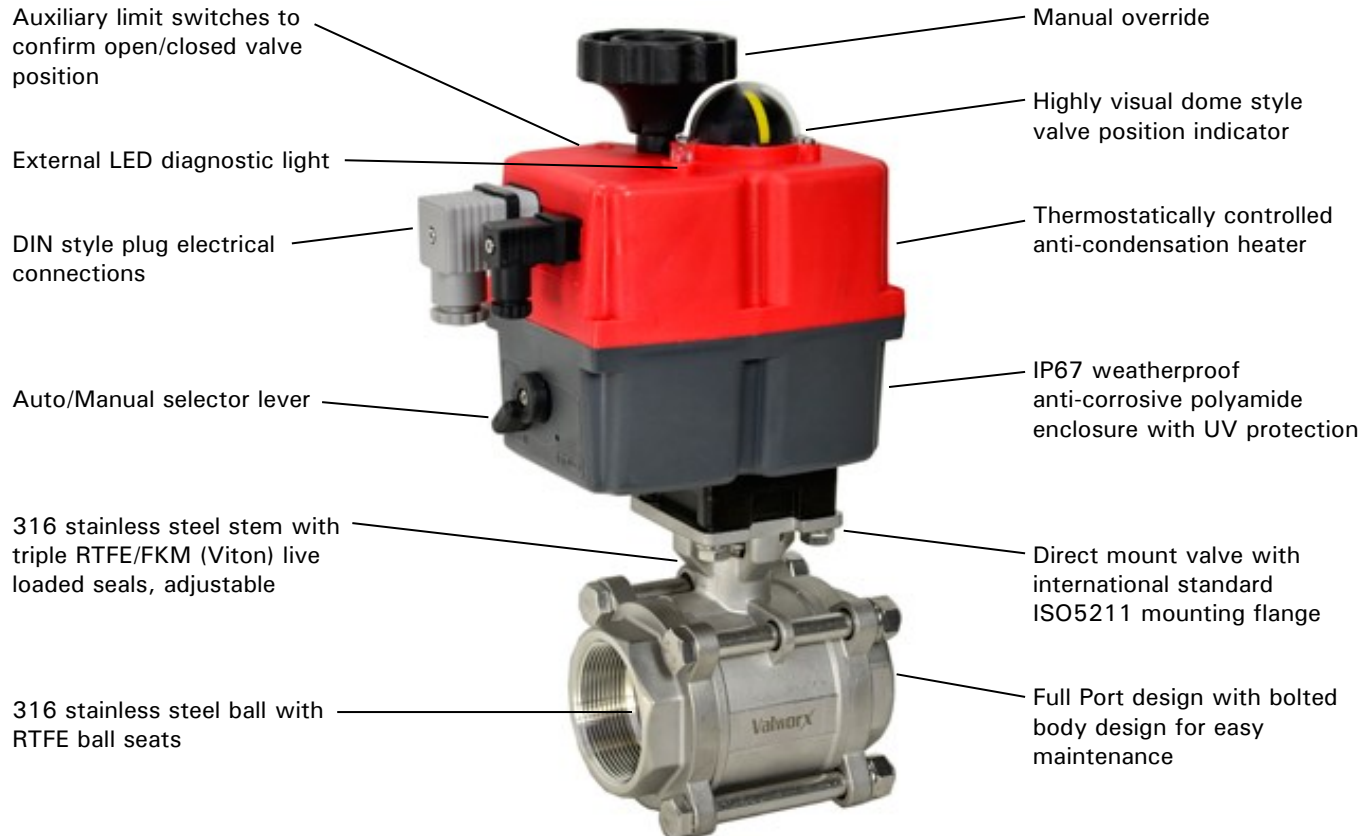
- CE mark conforming to:
  - Machinery directive
  - Low voltage directive
  - EMC Compatibility directive
- ISO5211 valve mounting



#### Valves

- CE conforming to:
  - 97/23/EC Pressure Equipment
- Pressure Tested per API 598
- Meets design MSS-SP-55, EN12516-3
- ISO5211 direct mounting flange

### Construction Features



### Pressure-Temperature

Valve Pressure Rating\*: 1000 PSI CWP non-shock 1/4 to 2" sizes  
300 PSI CWP non shock 2-1/2 to 3" sizes  
Vacuum 29inHg  
Steam 25 PSI with high temperature kit

Media Working Temperature: 0 to 158° F (-18 to 70° C)  
Media temperatures up to 266° F (130° C)  
with optional high temp. mounting kit

Ball Valve Temperature Rating: 0 to 356° F (-18 to 180° C)

Actuator Temperature Rating: -4 to + 158° F (-20 to 70° C)

\*See P/T chart

### Optional Functions

- **DPS**: Digital Positioner System - valve position (flow) controlled by 4-20mA or 0-10v input signal
- **BSR**: Battery Spring Return - actuator fails to a safe position with loss of external power

## Specifications (English units)

| Stock Number  | Pipe Size (NPT) | Orifice Size (inch) | Cv Flow Factor | Pressure (PSI)* | Cycle Time per 90° (sec) + /- 10% | Enclosure Rating | Max. Current Draw (Amps) |        |       |       |
|---|-----------------|---------------------|----------------|-----------------|-----------------------------------|------------------|--------------------------|--------|-------|-------|
|   |                 |                     |                |                 |                                   |                  | 115VAC                   | 240VAC | 24VAC | 24VDC |
| 24v-240v AC or DC ELECTRIC ACTUATED STAINLESS BALL VALVE: ON-OFF version  |                 |                     |                |                 |                                   |                  |                          |        |       |       |
| 560402E   | 1/4             | 0.45                | 8              | 1000            | 10                                | IP67             | 0.30                     | 0.20   | 1.20  | 0.80  |
| 560403E   | 3/8             | 0.49                | 10             | 1000            | 10                                | IP67             | 0.30                     | 0.20   | 1.20  | 0.80  |
| 560404E   | 1/2             | 0.59                | 15             | 1000            | 10                                | IP67             | 0.30                     | 0.20   | 1.20  | 0.80  |
| 560406E   | 3/4             | 0.79                | 35             | 1000            | 10                                | IP67             | 0.30                     | 0.20   | 1.20  | 0.80  |
| 560408E   | 1               | 1.00                | 60             | 1000            | 10                                | IP67             | 0.30                     | 0.20   | 1.20  | 0.80  |
| 560410C   | 1-1/4           | 1.25                | 90             | 1000            | 14                                | IP67             | 0.37                     | 0.20   | 1.73  | 1.25  |
| 560412C   | 1-1/2           | 1.50                | 125            | 1000            | 14                                | IP67             | 0.37                     | 0.20   | 1.73  | 1.25  |
| 560416C   | 2               | 2.00                | 240            | 1000            | 14                                | IP67             | 0.37                     | 0.20   | 1.73  | 1.25  |
| 120v-240v AC or DC ELECTRIC ACTUATED STAINLESS BALL VALVE: ON-OFF version |                 |                     |                |                 |                                   |                  |                          |        |       |       |
| 560420C   | 2-1/2           | 2.56                | 320            | 300             | 58                                | IP67             | 0.40                     | 0.20   | -     | -     |
| 560424C   | 3               | 3.15                | 580            | 300             | 58                                | IP67             | 0.40                     | 0.20   | -     | -     |
| 24v AC or DC ELECTRIC ACTUATED STAINLESS BALL VALVE: ON-OFF version       |                 |                     |                |                 |                                   |                  |                          |        |       |       |
| 560520C   | 2-1/2           | 2.56                | 320            | 300             | 58                                | IP67             | -                        | -      | 2.50  | 2.00  |
| 560524C   | 3               | 3.15                | 580            | 300             | 58                                | IP67             | -                        | -      | 2.50  | 2.00  |

Cv is the GPM of water at 60° F that will pass through the valve with 1 PSI pressure drop

\* Pressure at 100° F (reduced pressure at higher temperatures-see P/T chart)

Models with 240 volt range are single phase

## Pressure/Temperature Chart (PSI/°F)

| P/T Chart 1000 PSI |      |      |      |     |     |     |
|--------------------|------|------|------|-----|-----|-----|
| PSI                | 1000 | 1000 | 1000 | 950 | 875 | 750 |
| °F                 | 0    | 50   | 100  | 158 | 200 | 266 |

| P/T Chart 300 PSI |     |     |     |     |     |     |
|-------------------|-----|-----|-----|-----|-----|-----|
| PSI               | 300 | 300 | 300 | 300 | 300 | 300 |
| °F                | 0   | 50  | 100 | 158 | 200 | 266 |

## Specifications (Metric units)

| Stock Number  | Pipe Size (NPT) | Orifice Size (mm) | Kv Flow Factor | Pressure Max.(Bar)* | Cycle Time per 90° (sec)<br>+/- 10% | Enclosure Rating | Max. Current Draw (Amps) |        |       |       |
|---|-----------------|-------------------|----------------|---------------------|-------------------------------------|------------------|--------------------------|--------|-------|-------|
|   |                 |                   |                |                     |                                     |                  | 115VAC                   | 240VAC | 24VAC | 24VDC |
| 24v-240v AC or DC ELECTRIC ACTUATED STAINLESS BALL VALVE: ON-OFF version  |                 |                   |                |                     |                                     |                  |                          |        |       |       |
| 560402E   | 1/4             | 11.5              | 7              | 69                  | 10                                  | IP67             | 0.30                     | 0.20   | 1.20  | 0.80  |
| 560403E   | 3/8             | 12.5              | 8.6            | 69                  | 10                                  | IP67             | 0.30                     | 0.20   | 1.20  | 0.80  |
| 560404E   | 1/2             | 15                | 13             | 69                  | 10                                  | IP67             | 0.30                     | 0.20   | 1.20  | 0.80  |
| 560406E   | 3/4             | 20                | 30             | 69                  | 10                                  | IP67             | 0.30                     | 0.20   | 1.20  | 0.80  |
| 560408E   | 1               | 25                | 52             | 69                  | 10                                  | IP67             | 0.30                     | 0.20   | 1.20  | 0.80  |
| 560410C   | 1-1/4           | 32                | 77             | 69                  | 14                                  | IP67             | 0.37                     | 0.20   | 1.73  | 1.25  |
| 560412C   | 1-1/2           | 38                | 107            | 69                  | 14                                  | IP67             | 0.37                     | 0.20   | 1.73  | 1.25  |
| 560416C   | 2               | 50                | 206            | 69                  | 14                                  | IP67             | 0.37                     | 0.20   | 1.73  | 1.25  |
| 120v-240v AC or DC ELECTRIC ACTUATED STAINLESS BALL VALVE: ON-OFF version |                 |                   |                |                     |                                     |                  |                          |        |       |       |
| 560420C   | 2-1/2           | 65                | 275            | 21                  | 58                                  | IP67             | 0.40                     | 0.20   | -     | -     |
| 560424C   | 3               | 80                | 499            | 21                  | 58                                  | IP67             | 0.40                     | 0.20   | -     | -     |
| 24 AC or DC ELECTRIC ACTUATED STAINLESS BALL VALVE: ON-OFF version        |                 |                   |                |                     |                                     |                  |                          |        |       |       |
| 560520C   | 2-1/2           | 65                | 275            | 21                  | 58                                  | IP67             | -                        | -      | 2.50  | 2.00  |
| 560524C   | 3               | 80                | 499            | 21                  | 58                                  | IP67             | -                        | -      | 2.50  | 2.00  |

\* Pressure at 70° C (reduced pressures at higher temperatures- see P/T chart)

Models with 240 volt range are single phase

## Pressure/Temperature Chart (Bar/°C)

| P/T Chart 69 Bar |     |    |    |    |    |     |
|------------------|-----|----|----|----|----|-----|
| Bar              | 69  | 69 | 69 | 65 | 60 | 52  |
| °C               | -18 | 10 | 38 | 70 | 93 | 130 |

| P/T Chart 21 Bar |     |    |    |    |    |     |
|------------------|-----|----|----|----|----|-----|
| Bar              | 21  | 21 | 21 | 21 | 21 | 21  |
| °C               | -18 | 10 | 38 | 70 | 93 | 130 |

## Optional DPS - Digital Positioner System

The DPS Digital Positioner System is available as a factory installed option for Valworx 5604/5605 series electric actuated valves. Installing the DPS kit will change a standard On-Off type electric actuator to modulating or proportional control. This will allow positioning of the actuator output drive anywhere between 0 and 90° using either a 4-20mA or 0-10vdc input command signal. When using an electric actuated valve with DPS option, the output flow can be adjusted anywhere between 0-100%.

The DPS kit contains a microprocessor based control board and mounting hardware. The control board continuously monitors the analog input and output signals and compares them to the actual physical position of the output drive. An electric motor/gear drive moves the actuator output drive as required to balance the signals and find the desired position. The digital microprocessor ensures highly sensitive and repeatable control. The DPS is installed inside the actuator, under the red cover.



|                   |                    |
|-------------------|--------------------|
| Rotation          | 0-90°              |
| Input Signal      | 4-20mA or 0-10vdc  |
| Output Signal     | 4-20mA or 0-10vdc  |
| Accuracy          | 3% Full Scale      |
| Linearity         | 2% Full Scale      |
| Hysteresis        | 3% Full Scale      |
| Steps             | Min. 70 steps/ 90° |
| Impedance 4-20mA  | 100 Ohms           |
| Impedance 0-10vdc | 13K Ohms           |

Note: Overall accuracy of a valve assembly will vary depending on the type of valve selected and how the valve is mounted to the actuator. Output signals will be in the same format as input signal (ex: 4-20mA input, 4-20mA output).

The DPS system provides an accurate valve positioning function whereby the movement of the actuator is controlled by either a 4-20mA or 0-10vdc control signal. Any change in the control input signal results in a corresponding and proportional change in the position of the actuator (valve).

The DPS positioner has auto-calibration, no need to adjust zero and span settings. An output monitoring signal, in the same format as the input signal is also provided to confirm the output drive position (ex: 4-20mA input, 4-20mA output).

The standard DPS actuator will fail closed with loss of the control signal. Actuator can also be setup reverse-acting (4ma or 0v = open) and fail open with loss of the control signal. These electric actuators will fail in place with loss of external power.

### DPS Positioner Kit Ordering

| Kit Stock No.  | Input Signal | Valve Sizes     |
|----------------|--------------|-----------------|
| <b>561101C</b> | 4-20mA       | 1/4 to 2" NPT   |
| <b>561102C</b> | 0-10V        | 1/4 to 2" NPT   |
| <b>561108</b>  | 4-20mA       | 2-1/2 to 3" NPT |
| <b>561109</b>  | 0-10V        | 2-1/2 to 3" NPT |

• Kits are a factory installed option. The DPS kit is automatically installed and tested when ordered with an actuated valve.

## Optional BSR - Battery Spring Return

The BSR– Battery Spring Return kit is available as a factory installed option for Valworx 5604/5605 series electric actuated valves. The BSR kit will work with both on-off models and actuators with DPS positioners. The battery failsafe system provides an alternative source of power to drive the actuator to a preset failsafe position in the event of an external power failure. The industrial quality battery is constantly trickle charged during normal operation to assure maximum charge when required. The battery kit is installed under the actuator cover. No separate modules or boxes are required.

In many applications, the BSR battery spring return function tends to be a very economical option when compared to the alternate true mechanical spring return actuator. Valworx actuators with the BSR option are much smaller, lighter and less expensive.



| Actuated Valve with BSR Option  | 1/4 to 1" NPT | 1-1/4 to 2" NPT | 2-1/2 to 3" NPT |
|---|---------------|-----------------|-----------------|
| Working operations without recharge, with 100% initial battery charge | 5 operations  | 5 operations    | 1 operation     |
| Recharge time per working operation                                   | 8 min         | 10 min          | 50 min          |
| Full Charge Time 100%   | 28 h          | 28 h            | 27 h            |

The installed BSR kit will provide enough power to move the actuator/valve to a fail-safe position with loss of external power. The kit can be ordered as fail closed or fail open as required.

The actuator operates in the normal power open and power close mode while external power is available. Internal circuitry monitors the incoming main power and automatically switches within a few seconds to the battery backup with loss of external power. The battery will then provide enough power to move the actuator to a failsafe position. Under normal operation the external control power will trickle charge the battery and maintain a full charge.

In the normal mode of operation, an LED status light located on top of the actuator cover will be continuously lit. With a loss of power, the LED status light will blink slowly. On resumption of external power, conditional that the actuator control signal remained unchanged, the actuator will reset to the position it saw at the time of the main power failure.

### BSR Kit Ordering

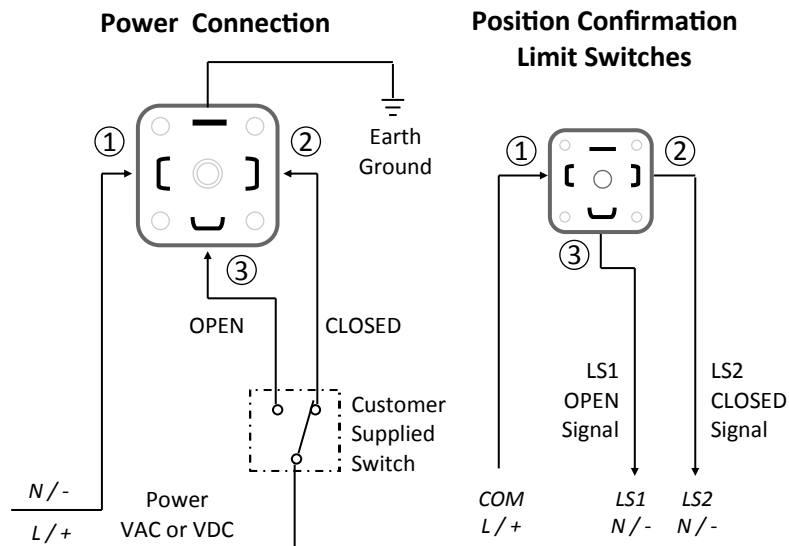
| Kit Stock      | Description                                     | Valve Sizes     |
|----------------|---|-----------------|
| <b>561104A</b> | 5610 BSR Battery Spring Return Kit, Fail Closed | 1/4 to 2" NPT   |
| <b>561105A</b> | 5610 BSR Battery Spring Return Kit, Fail Open   | 1/4 to 2" NPT   |
| <b>561106</b>  | 5616 BSR Battery Spring Return Kit, Fail Closed | 2-1/2 to 3" NPT |
| <b>561107</b>  | 5616 BSR Battery Spring Return Kit, Fail Open   | 2-1/2 to 3" NPT |

• Kits are a factory installed option. The BSR kit is automatically installed and tested when ordered with an actuated valve.

## Electrical Wiring: On/Off and BSR Battery Spring Return Versions

Voltages: 24-240 Volts and 24 Volt AC/DC models, 1 ph

Auto-voltage sensing



### Function: ON-OFF version

#### Power Connections

Power to PIN 1 and 2  
- actuator CLOSED

Power to PIN 1 and 3  
- actuator OPEN

Stays in last known position  
with loss of power.

### Function: ON-OFF version with BSR option

Wiring is the same as standard ON-OFF version.

Power to open, power to close - maintain power to trickle  
charge the battery system in either open or closed position.

Actuator sent by battery power to failsafe position with power  
failure.

Actuator returns to pre-failure position on power resumption.

### Function: Position confirmation limit switches

Dry contact 3A @ 125/250  
VAC, 30VDC resistive load

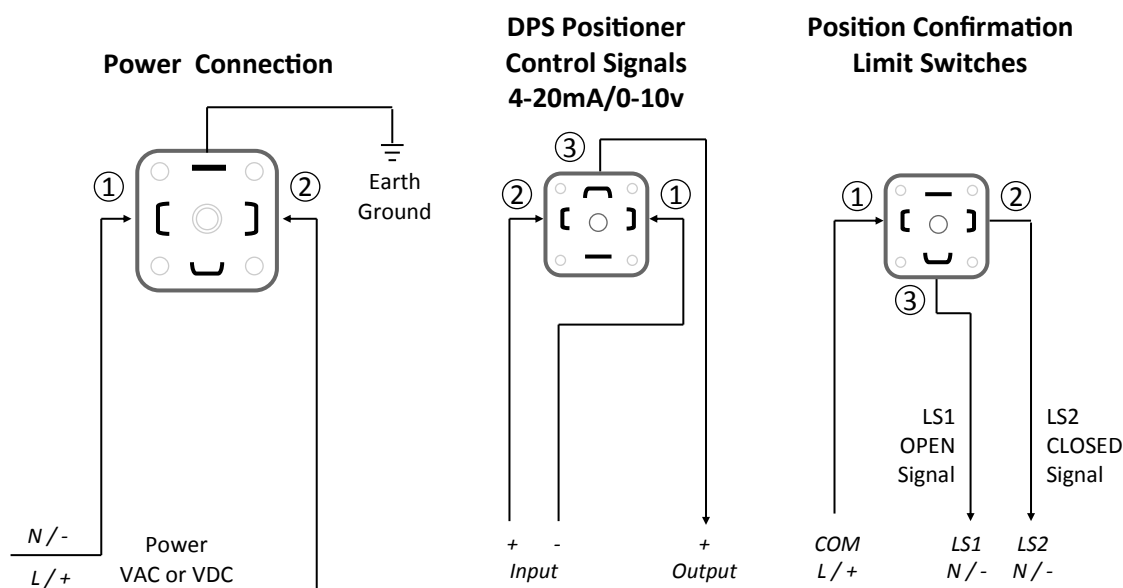
PIN 1 (COM) and 2 to confirm  
actuator is closed

PIN 1 (COM) and 3 to confirm  
actuator is open

## Electrical Wiring: Actuators with DPS Digital Positioner Option

Voltage: 85-240 Volts and 24 Volt AC/DC Models, 1 ph, (auto-voltage sensing)

Control Signal: 4-20mA or 0-10 VDC



### Function: Actuators with DPS—Digital Positioner Option

Power open, power close - actuator movement controlled by 4-20mA or 0-10VDC input signal.

Standard operation: 4mA or 0V = actuator closed, 20mA or 10V = actuator open (can be set-up reverse acting).

Actuator closes with loss of control signal, stays in last known position with loss of main power.

Output monitoring signal (in same format as supply signal) provided as standard.

### Function: Position confirmation limit switches

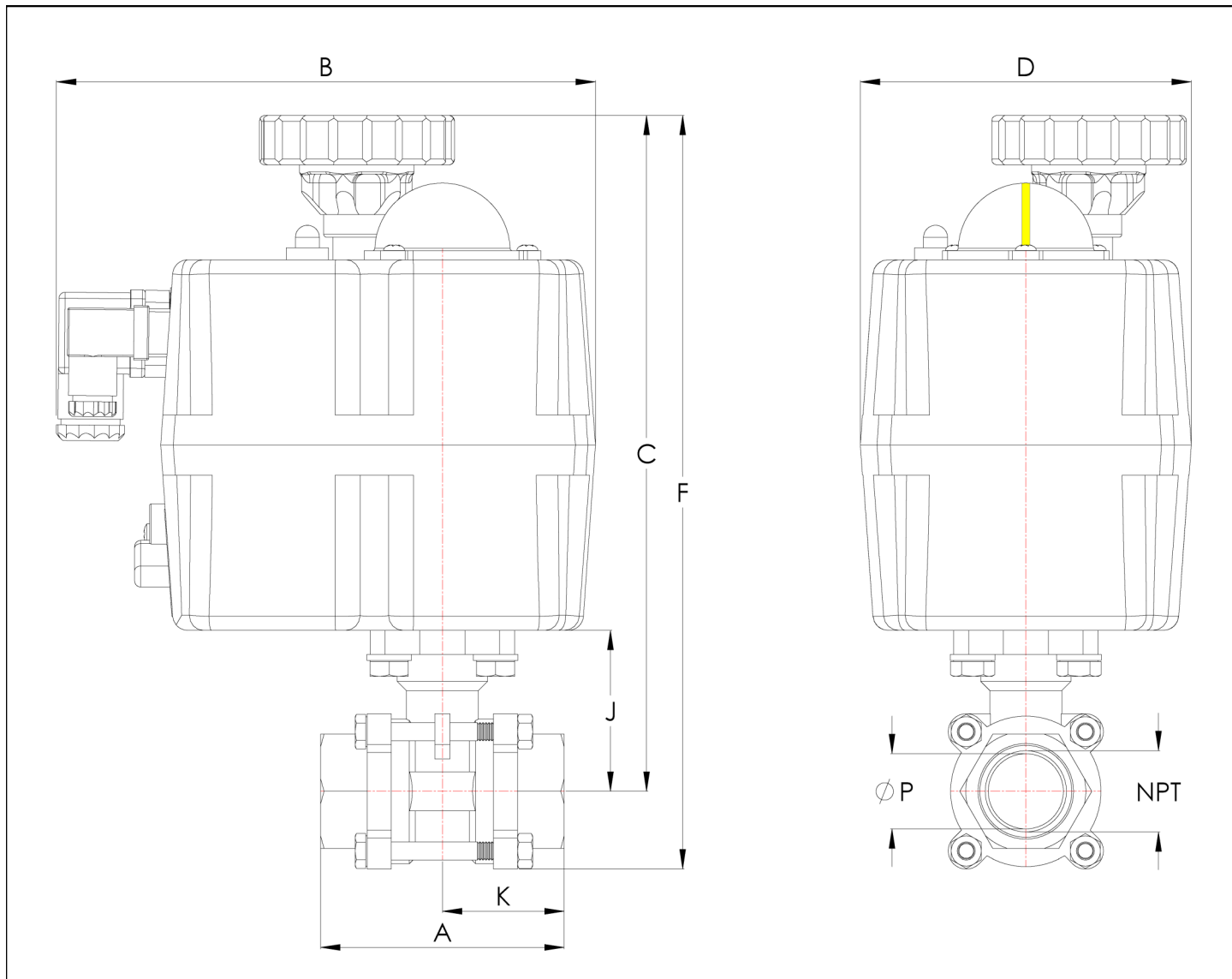
Dry contact 3A @ 125/250 VAC, 30VDC resistive load

PIN 1 (COM) and 2 to confirm actuator is closed

PIN 1 (COM) and 3 to confirm actuator is open

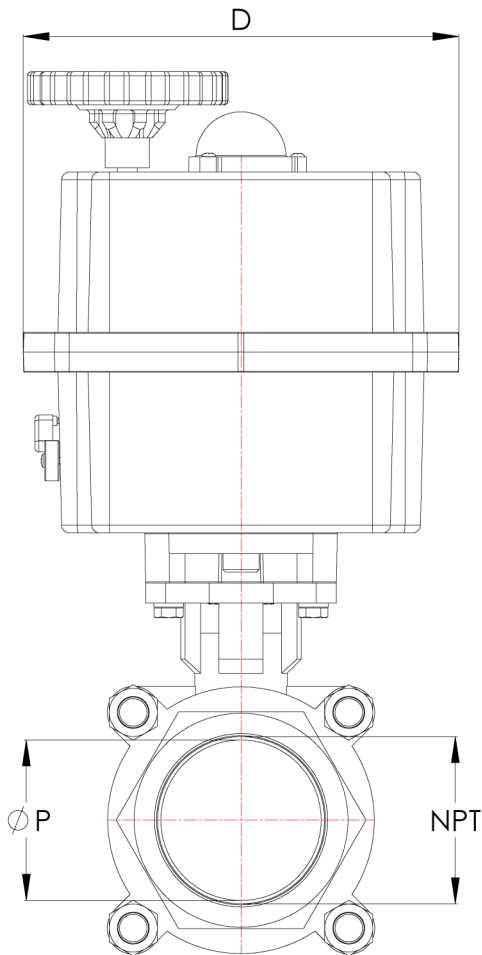
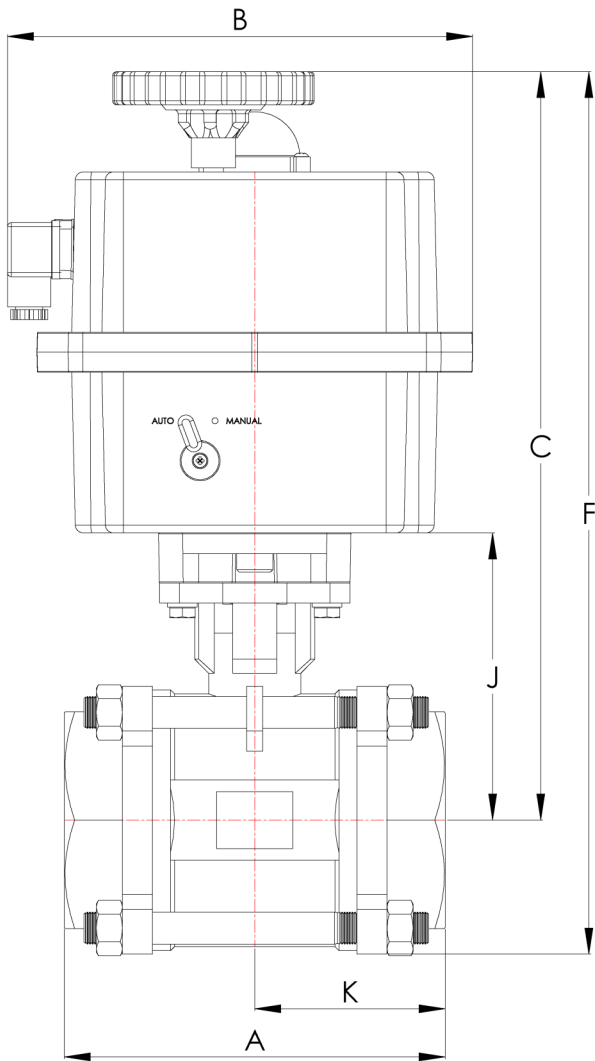


**Dimensions: 1/4 to 2 inch: inches (mm)**



| Pipe Size (NPT) | A           | B          | C           | D          | F           | J           | K           | P           | Weight lbs (kg) |
|-----------------|-------------|------------|-------------|------------|-------------|-------------|-------------|-------------|-----------------|
| 1/4"            | 2.50 (63.5) | 6.97 (177) | 8.19 (208)  | 4.33 (110) | 9.09 (231)  | 1.46 (37)   | 1.25 (31.8) | 0.45 (11.5) | 5.2 (2.4)       |
| 3/8"            | 2.50 (63.5) | 6.97 (177) | 8.19 (208)  | 4.33 (110) | 9.09 (231)  | 1.46 (37)   | 1.25 (31.8) | 0.49 (12.5) | 5.2 (2.4)       |
| 1/2"            | 2.50 (63.5) | 6.97 (177) | 8.19 (208)  | 4.33 (110) | 9.09 (231)  | 1.46 (37)   | 1.25 (31.8) | 0.59 (15)   | 5.1 (2.3)       |
| 3/4"            | 2.85 (72.5) | 6.97 (177) | 8.50 (216)  | 4.33 (110) | 9.53 (242)  | 1.77 (45)   | 1.43 (36.3) | 0.79 (20)   | 5.5 (2.5)       |
| 1"              | 3.19 (81.0) | 6.97 (177) | 8.86 (225)  | 4.33 (110) | 9.84 (250)  | 2.11 (53.5) | 1.59 (40.5) | 0.98 (25)   | 6.1 (2.8)       |
| 1-1/4"          | 3.72 (94.5) | 6.97 (177) | 10.04 (255) | 4.33 (110) | 11.34 (288) | 2.32 (59)   | 1.86 (47.3) | 1.26 (32)   | 8.4 (3.8)       |
| 1-1/2"          | 4.25 (108)  | 6.97 (177) | 10.67 (271) | 4.33 (110) | 12.17 (309) | 2.94 (74.8) | 2.13 (54)   | 1.50 (38)   | 10.2 (4.6)      |
| 2"              | 4.80 (122)  | 6.97 (177) | 11.02 (280) | 4.33 (110) | 12.83 (326) | 3.29 (83.5) | 2.40 (61)   | 1.97 (50)   | 13 (5.9)        |

Dimensions 2-1/2 to 3 inch: inches (mm)



| Pipe Size<br>(NPT) | A          | B          | C           | D          | F           | J          | K         | P         | Weight<br>lbs (kg) |
|--------------------|------------|------------|-------------|------------|-------------|------------|-----------|-----------|--------------------|
| 2-1/2"             | 6.22 (158) | 9.25 (235) | 14.21 (361) | 8.43 (214) | 16.37 (416) | 4.29 (109) | 3.11 (79) | 2.56 (65) | 28 (12.7)          |
| 3"                 | 7.48 (190) | 9.25 (235) | 14.65 (372) | 8.43 (214) | 17.20 (437) | 4.65 (118) | 3.74 (95) | 3.15 (80) | 35 (15.9)          |